enough to be more than a coincidence, and we believe, from our experience with this series of cases that tuberculin in doses determined by this method is a valuable aid in the treatment of surgical tuberculosis.

CONCLUSIONS.—1. The variation in susceptibility of different individuals to the action of tuberculin is marked.

2. The correct therapeutic dose of tuberculin for any individual can be determined accurately by the cutaneous reaction.

3. Tuberculin therapy by this method is a valuable aid in the treatment of surgical tuberculosis.

The writer desires to express his gratitude to Drs. R. T. Miller, Jr., and R. R. Huggins, in whose services these cases were treated, for the privilege of reporting the same, and to Drs. White and Van Norman, of the Tuberculosis League of Pittsburg, for their valuable suggestions and aid.

NOTE.—Since this paper was written the dose has been determined by the above method and given without producing constitutional symptoms in two cases, viz., tuberculosis of the cervical glands and tuberculosis of the hip, making a total of 30 cases.

THE INFLUENCE ON GASTRIC SECRETION OF ASEPTIC FOREIGN BODIES IN THE GALL-BLADDER.

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THESE experiments were undertaken in the hope of finding some explanation for the gastric hyperacidity so frequently found clinically in association with cholelithiasis. As originally planned they formed part of an extensive series dealing with this subject, but before the work was completed, Lichty's[1] work on the same subject and covering the same ground appeared, thus rendering unnecessary their further prosecution. It seems worth while, however, to report the results obtained in the first simple phase of the investigation, partly because they are not in general in accord with those of Lichty and partly because they control possible sources of error in his work. These are the use of the stomach-tube in feeding the animals, the administration of food at irregular intervals, and the brief postoperative period of observation.

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[1] The Relation of Disease of the Gall-bladder and Biliary Ducts to the Gastric Functions, AMER. JOUR. MED. SCI., January, 1911, vol. cxli, No. 1.

Lichty's conclusions are briefly as follow: (1) That a lesion of the gall-bladder and ducts may disturb the gastric function. (2) This disturbance most frequently consists of a hypersecretion of gastric juice and a diminution of gastric motility. (3) So-called hyperchlorhydria, with its accompanying symptoms, should be looked upon as an evidence of some definite pathological lesion somewhere in the gastro-intestinal tract or its appendages.

Methods. The essential feature of the experiment was to place in the gall-bladder with as little trauma as possible a more or less smooth sterile object, too large to enter the ducts, and after appropriate intervals to study the gastric secretion. The details follow:

In the preliminary control period a series of dogs under similar conditions of environment were fed daily, after fasting at least twelve hours, a uniform test meal consisting of one dog biscuit and 50 c.c. of water. The gastric contents were removed forty minutes later and examined by the usual methods of the clinical laboratory. A sufficient number of test meals were given to secure a reliable average figure for each dog individually. Then under complete ether anesthesia the gall-bladder was opened, a sterile round pebble introduced, and the gall-bladder carefully closed again. A month was allowed to elapse in order to exclude immediate post-operative effects, and at the end of that time the gastric contents were studied, at intervals, for six weeks to eight months, and in one dog as long as eleven months, under the same conditions as before operation. The periods of observation were ten days in length, with daily examination. A control animal was at hand and was similarly studied from time to time. After the last period the dogs were chloroformed and the gall-bladder, stomach, and pancreas examined.

This technique it was found could be very easily carried out. Dog biscuit was chosen because after they were accustomed to it the majority of the dogs would eat it readily, though, as a rule, a preliminary fasting of twenty-four hours was necessary before they could be induced to take the first meal. The dogs preferred the dry ground-up biscuits, which they devoured first, drinking the water afterward. Occasionally difficulty was experienced in persuading a dog to take this meal, but as the method seemed in every way preferable to that of Lichty, that is, introducing the meal through a stomach-tube, it was adhered to in all instances. The dogs were kept quietly in their cages after the test meal for forty minutes and the contents then removed by stomach-tube. The passage of a stomach-tube in a dog is very simple if the animal is properly gagged the first few times, after which with most dogs it can be performed without a gag by merely placing two fingers between the teeth alongside the tube. No effort was made to completely empty the stomach by lavage, as this was found to be very difficult if not impossible. In all about 300 test meals were removed and examined. The first hundred gastric contents obtained were examined in full, but subsequently only the free hydrochloric acid and the total acidity were estimated.

Five dogs were used, one of which was kept as control. The other four returned after operation to apparently perfect health and were studied for varying periods, one for only six weeks, two for eight months, and one for eleven months. At the autopsy on each of these four the foreign body was found in a gall-bladder, which was much shrunken and had greatly thickened walls, but showed no evidence of infection. Microscopic sections of the gall-bladder, stomach, and pancreas showed no significant changes.

Results. The gastric analyses showed no changes as the result of the experimental procedure. (See Table.) In two animals the average acidity after operation was higher than before, while in the other two the reverse was true. In all the animals, both before and after operation, the averages for free hydrochloric acid lay between the figures 16 and 24.6. The figures obtained with Dog I will serve as an example. Before operation 20 satisfactory gastric contents were recovered, with an average figure for free hydrochloric acid of 22.9. Five weeks after operation a series of nine meals gave an average of 20.1, three months after operation a series of ten meals gave 18.6, while eleven months after operation ten meals gave 21.9. The general postoperative average was 19.8. The difference between this and 22.9 is obviously too slight to be significant.

Dog	I	V	VIII	X	XII (control)[2]
Average before operation	22.9	16	23	24.6	18.1
Average after operation	19.8	21.3	19.2	15	24.1

The motility of the stomach did not seem in any instance to have been influenced by the experiment, although Lichty found retention in some of his cases.

I wish to express my thanks to Dr. Floyd E. Keene for his performance of the operations.

Conclusion. 1. For the study of gastric secretion in dogs repeated test meals (eight to ten must be given).

2. The test meal can be fed by mouth, which is preferable to administering it by tube.

3. The introduction of a sterile pebble into the gall-bladder of the dog caused no change in the gastric secretion or digestion or in the morphology of the stomach or pancreas within a period of eleven months after its introduction.

[2] Not operated on, but studied at corresponding times.